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October 24, 2011

Docket Nos.: 50-424

NL-11-2012

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant-Unit 1
Licensee Event Report 2011-002-00
Reactor Trip due to Main Feedwater
Regulating Valve Maintenance

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv)(A), Southern Nuclear Operating Company (SNC) is submitting the enclosed Licensee Event Report.

This letter contains no NRC commitments. If you have any questions, please contact Doug McKinney at (205) 992-5982.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "T. E. Tynan".

T. E. Tynan
Vice President – Vogtle

TET/TMH/kss

Enclosure: Unit 1 Licensee Event Report 2011-002-00

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Chief Nuclear Officer
Ms. P. M. Marino, Vice President – Engineering
RType: CVC7000

U. S. Nuclear Regulatory Commission
Mr. V. M. McCree, Regional Administrator
Mr. D. H. Jaffe, NRR Senior Project Manager - Vogtle
Mr. L. M. Cain, Senior Resident Inspector – Vogtle

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Enclosure

Unit 1 Licensee Event Report 2011-002-00

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Vogtle Electric Generating Plant – Unit 1

2. DOCKET NUMBER

05000 424

3. PAGE

1 OF 4

4. TITLE

Reactor Trip due to Main Feedwater Regulating Valve Maintenance

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	31	2011	2011	- 002 -	00	10	24	2011	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)			
I	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 50.73(a)(2)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	
	Specify in Abstract below or in NRC Form 366A			

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

Vogtle Electric Generating Plant/Mark Hickox, Principal Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

706-826-4129

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO

15. EXPECTED SUBMISSION DATE

MONTH

DAY

YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On August 31, 2011 with Unit 1 operating in Mode 1 at 100 percent rated thermal power at approximately 0906 hours Eastern Daylight Time, the Unit 1 reactor automatically tripped. In preparation for maintenance on the controls for the main feedwater regulating valve (MFRV) on steam generator (S/G) 2, the valve was placed on an air gag. The air gag maintains the MFRV in position and allows minor changes in steam generator water level to be controlled by the bypass feedwater regulating valve (BFRV). However, shortly after the air gag was installed, feedwater flow to S/G 2 increased beyond the capability of the BFRV to control. The increase in feedwater flow to S/G 2 resulted in water level on S/G 2 exceeding the Hi-Hi nominal trip setpoint (NTS). This caused a main feedwater isolation, turbine trip and subsequent reactor trip in accordance with plant design.

The cause of the event was due to increased air pressure being supplied to the MFRV when the valve was placed on the air gag. The first corrective action was revising the procedure to ensure calibrated test gauges are used to determine the pressure setting of the regulator for the air gag and for an operator to be present while the MFRV is controlled by the air gag. The second corrective action is to replace the contact type potentiometer used in the MFRV control circuit which has been proven unreliable.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

U.S. NUCLEAR REGULATORY COMMISSION

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Vogtle Electric Generating Plant – Unit 1	05000424	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2011	- 002	- 00	

NARRATIVE

A. REQUIREMENT FOR REPORT

This report is required per 10CFR50.73(a)(2)(iv)(A) due to an unplanned actuation of the Reactor Protection System (RPS) [JC] and an automatic actuation of the Auxiliary Feedwater System (AFW)[BA].

B. UNIT STATUS AT TIME OF EVENT

At the time of this event, Unit 1 was in Mode 1 (Power Operation) at 100 percent rated thermal power. Other than that described herein, there was no inoperable equipment that contributed to the occurrence of this event.

C. DESCRIPTION OF EVENT

Due to erratic behavior of feedwater flow to steam generator (S/G) 2 that was observed on August 26, 2011 a work order was initiated to replace the contact potentiometer on the main feedwater [SJ] regulating valve (MFRV) for S/G 2. The contact potentiometer is part of the control loop for the MFRV and has a chronic history of degradation as a result of localized vibration at the MFRV. On August 31, 2011 at approximately 0901 hours, the MFRV for S/G 2 was placed on an air gag to allow replacement of the contact potentiometer. Positioning of the MFRV during normal operation is the function of a three-element feedwater level control system [JB]. The three-element control system maintains feedwater flow equal to steam flow, and steam generator water level is used as an input to trim feedwater flow and maintain programmed water level. The air gag consists of a regulator, a pressure indicator, a three way valve and associated tubing, which is normally isolated from the output of the positioner for the MFRV. The purpose of the air gag is to bypass the positioner and supply air directly to the valve actuator at a given pressure to maintain the valve in position. However, it will not preclude the MFRV from closing in response to an Engineered Safety Features Actuation Signal (ESFAS). Once the air gag is installed, S/G level is controlled by the bypass feedwater regulating valve (BFRV). To place the MFRV on the air gag, operators are dispatched to the air gag panel located near the MFRV. The BFRV is then placed in position at approximately 50 percent demand and S/G level is verified to be stable. The operator records the air pressure from the pressure gauge on the output of the positioner to the MFRV. The operator then adjusts the pressure regulator associated with the air gag to this same pressure. Once these pressures are approximately equal, a three way valve is aligned to port the air directly from the output of the air gag regulator to the valve actuator while isolating air from the positioner to the MFRV. This maintains the position of the MFRV. However, shortly after the air gag was installed, feedwater flow to S/G 2 increased abruptly. The control room operator responded by closing the BFRV in 10 percent increments until the BFRV was fully closed. With the BFRV fully closed, feedwater flow to S/G 2 was still greater than it was prior to installation of the air gag. As a result, water level in S/G 2 continued to rise.

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NARRATIVE

When water level in S/G 2 reached the Hi-Hi level nominal trip setpoint (NTS), an automatic turbine trip and main feedwater isolation signal were initiated. The turbine trip, with power above the P-9 permissive setpoint, generated a reactor trip signal which then opened the reactor trip breakers. Additionally, the main feedwater isolation resulted in a trip of both main feedwater pumps and an automatic start of both motor driven auxiliary feedwater pumps in accordance with plant design. When turbine trip and reactor trip occurred, water level in all four steam generators went below the low-low level NTS causing an automatic start of the turbine driven auxiliary feedwater pump (TDAFWP). All required plant systems responded normal to the trip and no complications were observed.

D. CAUSE OF EVENT

A root cause team was formed to analyze this event. Troubleshooting directed by the root cause team determined that the pressure gauge associated with the air gag was indicating approximately 3 psig lower than the actual pressure applied. As a result, when the operators matched the indicated pressure from the air gag pressure gauge with the pressure gauge on the output of the positioner and aligned the three way valve to port air directly from the air gag regulator to the MFRV, the air pressure was approximately 3 psig higher than from the positioner. The increased air pressure to the MFRV actuator caused the valve to be further open than when it was controlled from the positioner. The root cause team determined that the abrupt increase in feedwater flow that was observed was consistent with the expected increase in valve travel with the 3 psig additional air pressure being applied. Since the increased feedwater flow through the MFRV was beyond the capability of the BFRV to control even with the BFRV fully closed, S/G 2 water level continued to rise until the Hi-Hi S/G level NTS was reached. This resulted in the reactor trip and subsequent AFW actuations.

E. SAFETY ASSESSMENT

As a result of the water level in S/G 2 exceeding the Hi-Hi NTS, a main feedwater isolation and turbine trip occurred in accordance with plant design. The turbine trip, with power above the P-9 permissive setpoint, generated a reactor trip signal which then opened the reactor trip breakers. Additionally, the main feedwater isolation resulted in a trip of both main feedwater pumps and an automatic start of both motor driven auxiliary feedwater pumps in accordance with plant design. The turbine trip and reactor trip caused water level in all four steam generators to go below the low-low level NTS which caused an automatic start of the TDAFWP. All rods fully inserted, the control room operators responded appropriately to control feedwater to the steam generators, and the plant was stabilized in Mode 3. Based upon these considerations, there was no adverse effect on plant safety or on the health and safety of the public as a result of this event. Additionally, since all safety systems functioned in accordance with plant design, this event does not involve a safety system functional failure.

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NARRATIVE

F. CORRECTIVE ACTION

1. The procedure for placing the MFRV on the air gag was revised to require the use of calibrated pressure gauges to determine the pressure from the positioner and from the air gag regulator.
2. The procedure was also revised to require an operator to stay at the air gag panel as long as it is controlling the MFRV.
3. The long term corrective is to implement a Design Change Package (DCP) to replace the contact style potentiometer with one that is not as susceptible to vibration induced wear. The expected completion date for this corrective action on Unit 1 is November 1, 2012 and May 1, 2013 on Unit 2.

G. ADDITIONAL INFORMATION

- 1) Failed Components: None. The MFRV opened in response to the increase in air pressure applied to the actuator from the air gag. Since the increase in feedwater flow was beyond the capability of the BFRV to control, steam generator level increased until it reached the Hi-Hi level NTS. All safety systems responded in accordance with the plant design.
- 2) Previous Similar Events: A review of LER's over the past six years finds that there were three previous occasions (LER 2005-003-00, 2005-004-00 and 2006-001-00) where issues associated with the MFRVs resulted in a reactor trip. Two of the previous LER's involved a failed I/P transducer, while the third LER involved a circuit board failure. Since this reactor trip was not due to a circuit board failure or an I/P transducer failure, previous corrective actions would not have prevented this trip. However, due to the reliability issues associated with the control loop components for the MFRVs, design changes were implemented starting in 2006. These design changes installed new digital valve positioners and the air gag on the MFRVs which allows the control loop components to be worked while the unit is at power. This was the first reactor trip that has occurred since installation of the design changes were implemented starting in 2006.
- 3) Energy Industry Identification System Code:
Main Feedwater System – SJ
Auxiliary Feedwater System – BA
Plant Protection System – JC
Feedwater/Steam Generator Level Control System - JB